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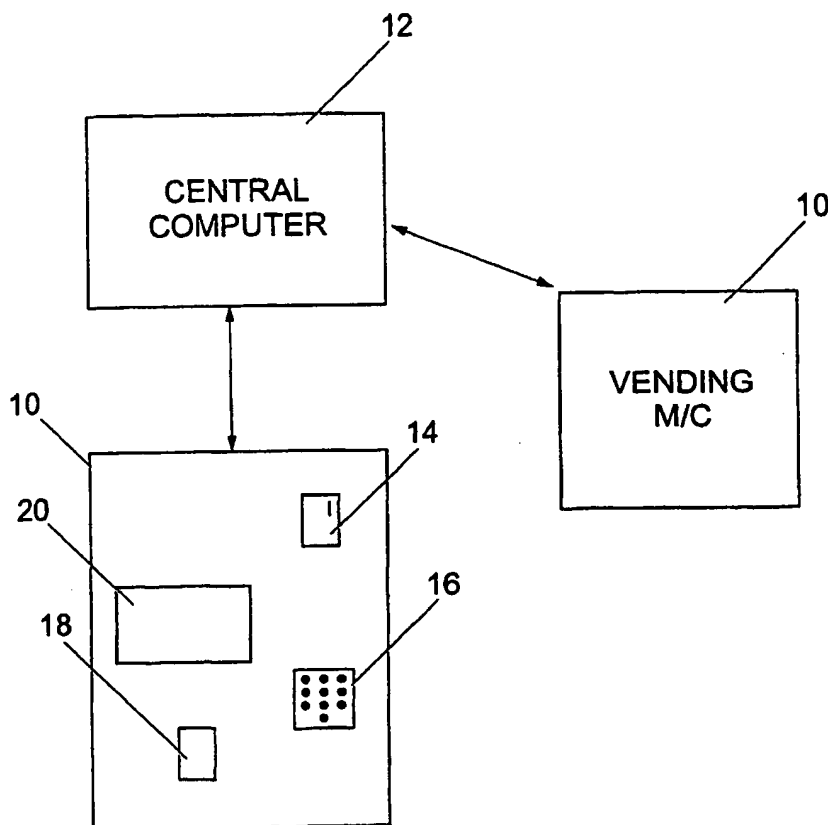
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(54) Title: INTERACTIVE DISPENSING APPARATUS



(57) Abstract: A vending machine (10) in addition to the normal coin acceptor (14) and selection keypad (16) has a display screen (20) which is used in conjunction with the keypad (16) to interact with the user. The vending machine (10) and similar vending machines form part of a system communicating with a central computer (12) which monitors stock levels and machine functions, and also derives information, such as marketing information and customer preferences, from the user interaction and may modify displayed material accordingly.

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1 "Interactive Dispensing Apparatus"

2

3 This invention relates to apparatus for dispensing or
4 vending goods, such as drinking water dispensers,
5 vending machines for hot or cold drinks or snacks,
6 photobooths, photocopiers, and other such apparatus.

7

8 Hitherto, dispensing apparatus of this type have
9 displayed only minimal information of a purely
10 functional nature to the users, and the only
11 information supplied by the user has been to indicate
12 the type and/or quantity of goods desired.

13

14 The present invention is based upon the realisation
15 that the presence and use of dispensing apparatus
16 provides an opportunity for interaction with a wide
17 range of consumers.

18

19 Also, many forms of dispensing apparatus have in the
20 past suffered from poor vendor service with stock

1 commonly running out. Preferred forms of the present
2 invention also address this difficulty.

3

4 Accordingly, the present invention in one aspect
5 provides a dispensing apparatus comprising means for
6 dispensing at least one product when requested by a
7 user; an interactive user interface comprising means
8 for imparting information to the user, and user-
9 operated data input means adapted to permit the user
10 to input both product-dispensing commands and data
11 not necessarily related to product dispensing; memory
12 means for storing data related to use of the
13 apparatus; and communication means arranged to
14 transmit said data between the apparatus and a remote
15 management location.

16

17 The data may be data relating to users of the
18 machine, or to the operational status of the machine,
19 or both.

20

21 The means for imparting information to the user may
22 suitably comprise a display screen, and the user-
23 operated data input means may be in the form of a
24 keyboard or touch sensitive areas on said screen.
25 The display screen may be a simple one line LED
26 screen, through to a full colour, full motion screen
27 which may be used to display advertising or
28 informational material.

29

1 The communication means may comprise means for
2 periodic connection via a public telephone network, a
3 GSM service, the Internet, or some other available
4 communications network to a central control location.

5

6 Preferably, the communication means is arranged to
7 receive data defining material to be displayed, such
8 as advertisements.

9

10 The invention is capable of controlling functions of
11 equipment to which it is fitted (the host equipment)
12 and by assessing the status of sensors and other
13 devices to which it is connected within the host
14 equipment it is able to perform logical functions
15 that result in an output action, for example;

16

17 Thermostatic control of the temperature of
18 products that are contained within the host equipment

19 Control of dispensing valves, doors, switches,
20 chutes, motors, lamps etc

21

22 The display can be used to permit engineering and/or
23 servicing diagnostic testing to be performed to
24 assess the operational status of the equipment during
25 maintenance/configuration/repairs etc and also to the
26 user during normal operation.

27

28 Data can be made available to the invention from
29 sources appropriate to the volumes/speed/bandwidth
30 requirements of suitable data storage devices

1 connected to the invention for example, flash memory,
2 CD ROM, DVD, Video Tape.

3

4 Data for display can also be sent to the invention
5 over the communications network.

6

7 The invention when fitted with an optional studio
8 reproduction/recognition module is able to produce
9 sounds/music/speech and also to respond to spoken
10 stimulus which may be associated with
11 visual/messages/video/display information produced by
12 the invention.

13

14 From another aspect, the invention provides a method
15 of managing a plurality of dispensing apparatus at a
16 variety of locations, the method comprising remotely
17 monitoring the persons using and/or the products
18 dispensed at each location, and controlling the
19 dispensing apparatus and/or causing information to be
20 displayed at each location in a manner determined or
21 modified by the information collated by said
22 monitoring.

23

24 The information displayed may comprise advertising.

25

26 Preferably the information is displayed via an
27 interactive display to permit a response by the user.
28 This may be used to generate consumer follow up in
29 response to the advertising, or data related to

1 advertising effectiveness, to provide the opportunity
2 to win prizes, or for amusements.

3

4 The information displayed may be modified according
5 to the product requested by a particular user, or
6 according to the product mix requested at that
7 location, or the data and time of day.

8

9 An embodiment of the invention will now be described,
10 by way of example, with reference to the drawings, in
11 which:

12

13 Fig. 1 is a block diagram illustrating a system
14 embodying one form of the invention;

15

16 Fig. 2 is a block diagram showing a preferred
17 form of information handling within a vending
18 machine of Fig. 1;

19

20 Fig. 3 illustrates one-line text displays;

21

22 Fig. 4 illustrates multi-line displays; and

23

24 Fig. 5 illustrates a number of possible
25 embodiments of the invention in the form of a
26 water cooler.

27

28 Referring to Figure 1, a number of vending machines
29 10, only two of which are shown, are in periodic
30 communication with a central computer 12. As

1 indicated in Fig. 1, each vending machine 10 is of a
2 conventional arrangement insofar as it comprises a
3 payment acceptor 14, a keyboard 16, and a product
4 dispense location 18. The actual vending operation
5 is entirely conventional and will not be described
6 herein. The vending machine additionally comprises a
7 display screen indicated at 20. The display screen
8 20 could be a single-line LED screen displaying
9 stationary or scrolling messages. Alternatively, it
10 could be a larger screen showing text, or a fully
11 functional moving video display.

12

13 Each vending machine also contains additional
14 electronics as illustrated in Figure 2.

15

16 A communication device 21 handles communication with
17 the central computer 12. The communication device 21
18 may be a device for working over the public telephone
19 network, a GSM network, or the Internet, or any other
20 available network. The communication device 21 is
21 interfaced with the remainder of the electronics via
22 a communications interface 22. Suitable forms of
23 communication device 21 and communications interface
24 22 are well known in the art.

25

26 The electronics are co-ordinated and controlled by a
27 processing and control circuit 23, which may suitably
28 be a programmable logic controller. The controller
29 23 drives the display 20 via a display interface 24.
30 A memory 25 is provided, which will typically store

1 both data collected from the dispenser and display
2 information for use in driving the display 20. The
3 form of memory used will be dependent on the nature
4 of display desired. For simple text messages, a
5 flash memory or simple ROM may be sufficient, while
6 for full motion, full colour visuals it may be
7 appropriate to use a mass storage device such as a
8 CD-ROM or videotape. The memory 25 will also require
9 to include read/write memory such as a RAM chip.

10

11 A sensor/data collection interface 26 is provided to
12 provide the controller 23 with information from the
13 keyboard 16 and from the dispensing apparatus itself.
14 For example, the apparatus may monitor sensors such
15 as temperature sensors and switches used in counting
16 machine contents. A control interface 27
17 interconnects the controller 23 with devices within
18 the dispenser which require to be controlled, such as
19 motors and switches.

20

21 The various circuits of Figure 2 are powered by a
22 power supply 28, which may incorporate a back-up
23 supply to maintain memory and communication functions
24 during any loss of mains power.

25

26 The electronics of Figure 2 may be arranged in three
27 modules. A first module contains the controller 23
28 and the power supply 28. A second module contains
29 the communication device 21 and the communications

1 interface 22. A third module contains the interfaces
2 24, 26 and 27 and the memory 25.

3

4 The use of a three module system of this kind is
5 preferred, since the first module can be common to a
6 range of applications, while the second module can be
7 one of a variety depending upon the communication
8 channel, and the third module can be one of a variety
9 depending upon the dispensing apparatus to which it
10 is applied, or the messages to be displayed.

11

12 In use, the central computer 12 either polls or is
13 polled by the various machines under its supervision
14 at appropriate intervals of time, or on the
15 occurrence of predetermined effects. The data
16 collection interface 26 in each machine is preferably
17 arranged to collect data regarding the operation of
18 the machine, such as stock level or any malfunctions,
19 and this is monitored by the central computer to
20 arrange servicing and supplies.

21

22 In addition however the display screen 20 is used in
23 an interactive mode with the user, and the
24 information for this and an analysis of the results
25 of it are communicated to and monitored by the
26 central computer.

27

28 In one fairly simple example, the screen 20 may
29 display advertising material, with the nature of the
30 material being altered in accordance with the usage

1 of the machine and the nature of the products in most
2 demand.

3

4 Alternatively, there may be a more fully interactive
5 relationship with the user. For example, the screen
6 could display information in the nature of a quiz
7 with responses being input via the keyboard 16. A
8 relationship of this nature could be used for example
9 to provide prizes by way of free product from the
10 machine or otherwise, which could be a means for
11 improving the usage and sales at the machines.

12

13 As discussed above, a variety of displays may be
14 used.

15

16 Figure 3 illustrates a one-line text display used for
17 advertising or imparting information. In Figure 1a,
18 a static or sideways scrolling text is used to
19 advertise a special offer available on the dispenser.
20 Figure 1b shows a sideways scrolling display giving
21 current information, such a Stock Exchange news.

22

23 Figure 4 gives examples of a 3 or 4 line display
24 operating a user quiz, which could offer prizes such
25 as a free vend.

26

27 Alternatively, a video display can be used for
28 example to show a predetermined advertising film
29 while a given product is being dispensed.

30

1 The arrangement described enables the dispenser to
2 gather and communicate to the central computer
3 information which is useful in managing the vending
4 operation. In particular, the information will
5 suitably include data on the types of person using
6 individual machines and their product preferences.
7 This can be used to optimise the product mix offered
8 for sale. The information can also have value to
9 third parties. For example, a manufacturer may wish
10 to know the age and social profile of purchasers of a
11 particular product, or the fact that certain products
12 are commonly bought together, or geographical
13 variations in product preference.

14

15 The interactivity of the present invention
16 facilitates the collection of information of this
17 type, and enables the disclosure of such information
18 to be encourage by, for example, the use of quizzes
19 and prizes.

20

21 Figure 5 shows a number of possible implementations
22 of the invention in a water cooler as commonly used
23 in office situations. In each of these, the
24 interaction may be by means of a one-line LED
25 display, through to a small touch sensitive screen
26 which can be readily integrated into a range of
27 aesthetically attractive designs.

28

1 In addition to interaction with the consumer, the
2 same data collection and communications electronics
3 can be used to monitor the following:

4

5 Tap operation - determining water flow, and
6 dispensing activity, dispenser usage profiling.

7

8 Water heater and chiller operation.

9

10 Temperature of dispensed water, hot, chilled ambient
11 and mixed (variably chilled).

12

13 Mains electrical supply -Detect presence of mains
14 electricity - detect disconnection and connection to
15 mains electricity.

16

17 Following the detection of mains failure a
18 rechargeable battery power supply will supply
19 electrical energy to allow continued function of the
20 invention.

21

22 The insertion and removal of water bottle, water
23 reservoir, or a disposable water delivery mechanism
24 of known type.

25

26 Dispenser sanitisation activity

27

28 Control and monitoring additional
29 facilities/equipment (such as carbonator, oxygenator,
30 or water quality/identity check module) which are

1 either an integral part of the dispenser or ancillary
2 external equipment.

3

4 Suitable sensors and control devices for carrying out
5 these functions will be readily apparent to those in
6 the art.

7

8 A further preferred feature of the invention resides
9 in providing the bottles or containers used in the
10 dispensing apparatus with electronic tags of a type
11 known per se. Each tag can, for example, identify
12 the place and date of manufacture or supply. The tag
13 can then be interrogated by the dispenser and data
14 communicated to the central computer. As one
15 example, this can be used to identify and warn of
16 outdated stock being used. The tag can also be used
17 to track the products in the supply chain. Instead
18 of electronic tags, either forms of machine-readable
19 identification may be used such as bar codes, or even
20 the use of a specified colour or shape of closure to
21 identify a given product or supplier.

22

1 CLAIMS

2

- 3 1. A dispensing apparatus comprising means for
4 dispensing at least one product when requested
5 by a user; an interactive user interface
6 comprising means for imparting information to
7 the user, and user-operated data input means
8 adapted to permit the user to input both
9 product-dispensing commands and data not
10 necessarily related to product dispensing;
11 memory means for storing data related to use of
12 the apparatus; and communication means arranged
13 to transmit said data between the apparatus and
14 a remote management location.
- 15
- 16 2. Apparatus according to claim 1, in which the
17 data relates to at least one of: users of the
18 machine and the operational status of the
19 machine.
- 20
- 21 3. Apparatus according to claim 1 or claim 2, in
22 which the means for imparting information to the
23 user comprises a display screen
- 24
- 25 4. Apparatus according to claim 3, in which the
26 display screen is a text character screen formed
27 by a LED or LCD array.
- 28
- 29 5. Apparatus according to claim 3, in which the
30 display screen is a picture screen.

31

- 1 6. Apparatus according to any preceding claim, in
2 which the data input means is a keyboard or
3 keypad.
4
- 5 7. Apparatus according to claim 5, in which the
6 data input means comprises touch-sensitive means
7 on said picture screen.
8
- 9 8. Apparatus according to any preceding claim, in
10 which the communication means comprises means
11 for periodic connection to a central control
12 location via a standard communications network
13 such as public telephone network, a GSM service,
14 or the Internet.
15
- 16 9. Apparatus according to any preceding claim, in
17 which the communication means is arranged to
18 receive data defining material to be displayed.
19
- 20 10. Apparatus according to any preceding claim,
21 wherein the dispenser includes sensors and
22 control devices enabling the dispenser to
23 perform logical functions.
24
- 25 11. Apparatus according to claim 10, in which said
26 logical functions comprise one or more of:
27 thermostatic control of the temperature of
28 products within the dispenser, and control of
29 dispensing valves, doors, switches, chutes,
30 motors, and lamps.
31

- 1 12. Apparatus according to claim 10, in which the
2 dispenser includes means for reading
3 identification tags affixed to containers
4 removably positioned within the dispenser.
5
- 6 13. Apparatus according to any preceding claim, in
7 which the display the display is additionally
8 usable to permit engineering and/or servicing
9 diagnostic testing to be performed to assess the
10 operational status of the invention during
11 maintenance, configuration or repairs.
12
- 13 14. Apparatus according to any preceding claim,
14 including a data storage device such as flash
15 memory, CD-ROM, DVD, or videotape.
16
- 17 15. Apparatus according to any preceding claim,
18 including a studio reproduction and/or
19 recognition for producing music or speech,
20 and/or for responding to spoken stimulus from a
21 user.
22
- 23 16. A method of managing a plurality of dispensing
24 apparatus at a variety of locations, the method
25 comprising remotely monitoring the persons using
26 and/or the products dispensed at each location,
27 and controlling the dispensing apparatus and/or
28 causing information to be displayed at each
29 location in a manner determined or modified by
30 the information collated by said monitoring.
31

- 1 17. The method of claim 16, in which the information
2 displayed comprises advertising.
3
- 4 18. The method of claim 16 or claim 17, in which the
5 information is displayed via an interactive
6 display which permits a response by the user.
7
- 8 19. The method of any of claims 16 to 18, in which
9 the information displayed is modified according
10 to the product requested by a particular user,
11 or according to the product mix requested at
12 that location, or the data and time of day.
13
- 14 20. The method of any of claims 16 to 19, which
15 includes providing materials to be dispensed in
16 containers labelled with machine-readable
17 labels, reading the label of each container when
18 inserted in a dispenser, and communicating data
19 from the label to the remote monitoring point.



1 / 4

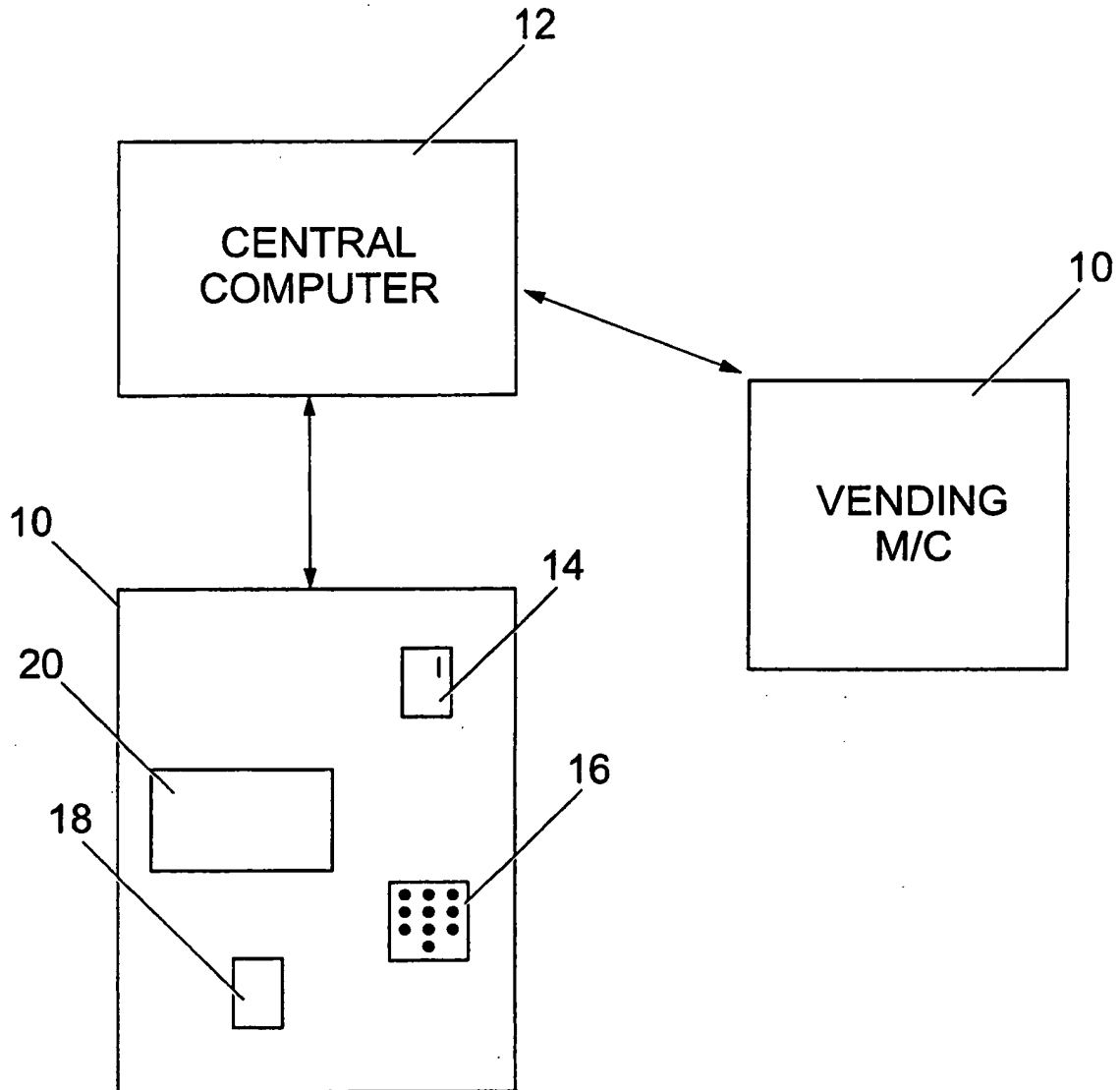
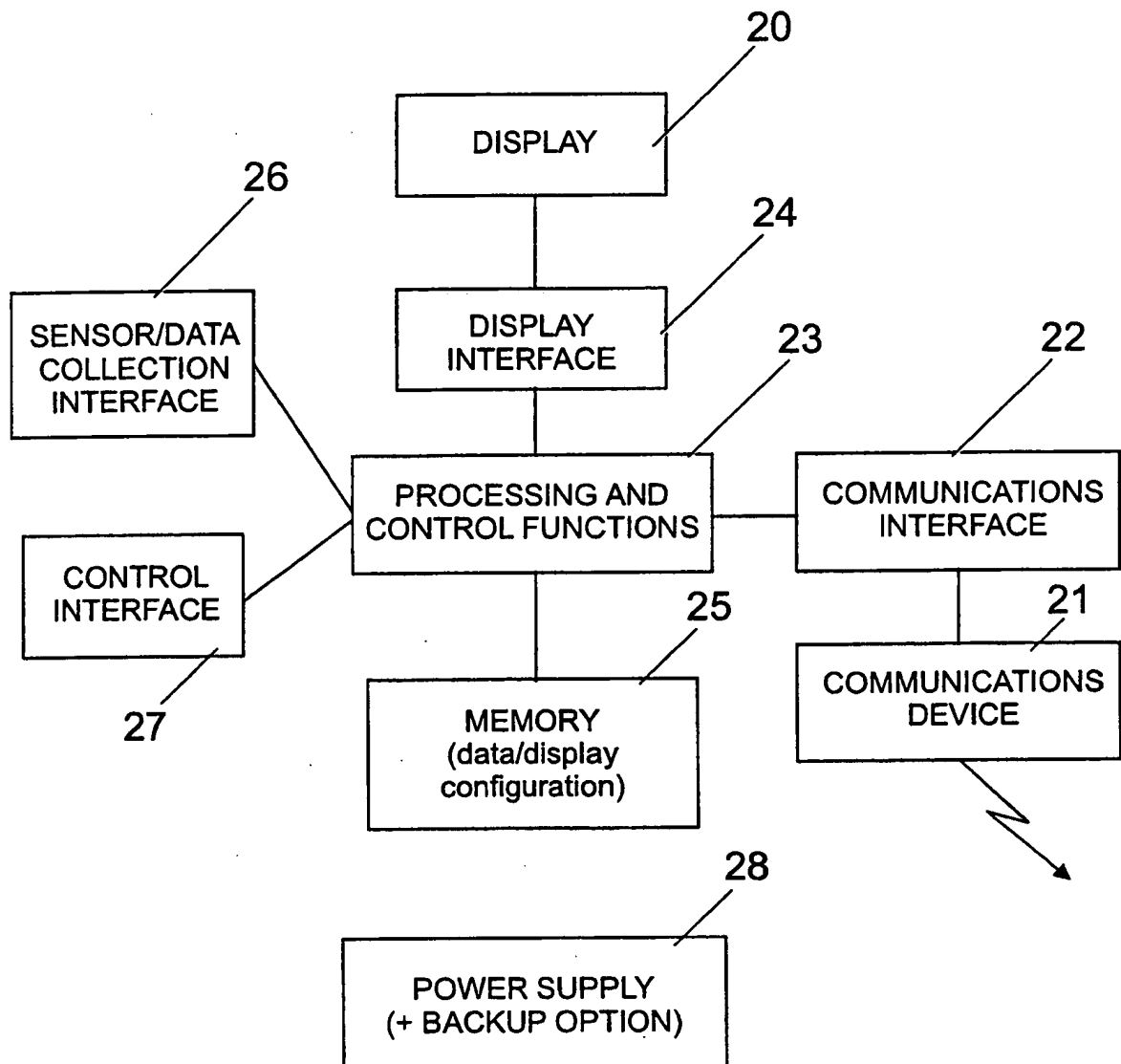


Fig. 1

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*Fig. 2*

3/4

SPECIAL OFFER-COLA 40p

Fig. 3a

FTSE↓30 6408___DOW↓40 10752_

Fig. 3b

HOW MANY PINTS IN A GALLON

A:4 B:8 C:16

SELECT NOW

Fig. 4a

WHAT IS THE DISTANCE
BETWEEN LONDON AND BEIJING

A: 3845 B: 4685 C: 5055

SELECT NOW

Fig. 4b

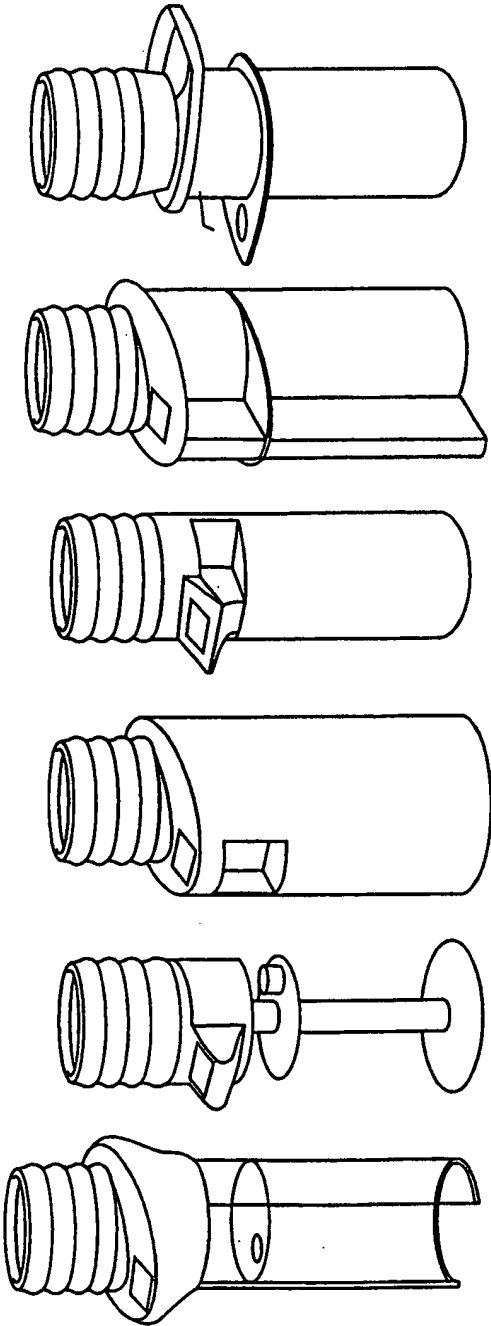


Fig. 5

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/04663

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07F9/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 572 119 A (KEYOSK CORPORATION) 1 December 1993 (1993-12-01)	1,3,6, 8-11,14, 16,19 12,17,20
A	abstract; claims; figures column 5, line 1 -column 6, line 50 ---	
Y	US 4 803 348 A (D.W. LOHREY) 7 February 1989 (1989-02-07)	1,3,6, 8-11,14, 16,19 2,4,18
A	abstract; claims; figures column 8, line 10 -column 10, line 30 ---	
A	US 4 449 186 A (G.M. KELLY) 15 May 1984 (1984-05-15) abstract; figures column 1, line 62 -column 6, line 5 column 103, line 34 -column 106, line 51 --- -/--	1-9,16, 18,19



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

29 March 2001

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06/04/2001

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

In. ational Application No

PCT/GB 00/04663

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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